Amendments To The Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Currently Amended) A process for producing polyimide aerogels comprising:

contacting a diamine monomer and an aromatic dianhydride monomer in a first solvent under conditions conducive to formation of a poly(amic acid), wherein the diamine monomer is an aromatic diamine, an aliphatic diamine, a bis(ω-aminoalkyl)terminated polysiloxane or a combination thereof;

contacting the poly(amic acid) in ~~a~~ said first solvent with a chemical dehydrating agent to form a polyimide gel by imidization; and

drying the polyimide gel in the presence of supercritical CO_2 to afford an polyimide aerogel.

2. (Original) The process of claim 1 in which the first solvent is not miscible with supercritical CO_2, the method further comprises the step of exchanging the first solvent with a second solvent which is miscible with supercritical CO_2 prior to drying the polyimide gel.

3. (Original) The process of claim 1 in which the process further comprises post-curing the polyimide aerogel at a temperature of between about 50°C and about 450°C before or after supercritical CO_2 drying.

4-8. (Cancelled).

9. (Currently Amended) The process of ~~claim 8~~claim 1, wherein the chemical dehydrating agent is a mixture of an alkanoic anhydride and an organic base selected from optionally substituted pyridines and optionally substituted trialkyl amines.

10. (Original) The process of claim 1, wherein the product polyimide aerogel has surface area in excess of 500 m^2/g, a mesoporous pore size of between about 5 nm and about 100 nm, and a narrow pore size distribution.

11. (Original) The process of claim 1, wherein the product polyimide aerogel has surface area in excess of 1000 m^2/g, a mesoporous pore size of between about 5 nm and about 100 nm, and a narrow pore size distribution.

12. (Cancelled).

13. (Currently Amended) A process of producing a carbon aerogel comprising the steps of

contacting a diamine monomer and an aromatic dianhydride monomer in a first solvent under conditions conducive to formation of a poly(amic acid)), wherein the diamine monomer is an aromatic diamine, an aliphatic diamine, a bis(ω-aminoalkyl)terminated polysiloxane or a combination thereof;

contacting the poly(amic acid) in ~~a~~said first solvent with a chemical dehydrating agent to form a polyimide by imidization;

drying the polyimide gel in the presence of supercritical CO_2 to afford an polyimide aerogel; and

pyrolyzing the polyimide aerogel under in an inert atmosphere to form a carbon aerogel, wherein the carbon aerogel further comprises between about 0.01% and about 15% nitrogen by weight.

14. (Original) The process of claim 13 in which the first solvent is not miscible with supercritical CO_2, the method further comprises the step of exchanging the first solvent with a second solvent which is miscible with supercritical CO_2 prior to drying the polyimide gel.

15. (Original) The process of claim 13 in which the process further comprises post-curing the polyimide aerogel at a temperature of between about 50°C and about 450°C before or after supercritical CO_2 drying.

16-19. (Cancelled).

20. (Currently Amended) The process of ~~claim 19~~claim 13, wherein the chemical dehydrating agent is a mixture of an alkanoic anhydride and an organic base selected from optionally substituted pyridines and optionally substituted trialkyl amines.

21. (Original) The process of claim 13, wherein the product carbon aerogel has surface area in excess of 400 m^2/g, a mesoporous pore size of between about 5 nm and about 100 nm, and a narrow pore size distribution.

22. (Original) The process of claim 13, wherein the product carbon aerogel has surface area between about 500 m^2/g and about 1200 m^2/g, a mesoporous pore size of between about 5 nm and about 100 nm, and a narrow pore size distribution.

23. (Cancelled).

24. (Previously Presented) The process of claim 13, wherein the composition of the carbon aerogel comprises up to about 9% nitrogen by weight at a pyrolysis temperature of 700°C or up to about 6.5% nitrogen by weight at a pyrolysis temperature of 900°C.

25-38. (Cancelled).

39. (Previously Presented) The process of claim 1 or claim 13, wherein a reinforcing agent is added to the polyimide wet gel before drying with supercritical CO_2.

40. (Original) The process of claim 39, wherein the reinforcing agent is selected from a reinforcement pad, organic or inorganic fibers carbon nanotubes, metallic fillers or particles or inorganic fillers or particles.

41. (Original) The process of claim 39, wherein the fiber reinforcement pad is selected from a non-woven or woven fiber reinforcement composed of a polymeric organic fiber, a glass fiber, a ceramic fiber, a carbon precursor fiber, or a biopolymer fiber.

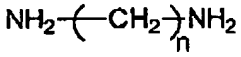
42. (Previously Presented) The process of claim 1 or claim 13, in which the process further comprises a post-curing step, at an elevated temperature, to induce substantially complete imidization, wherein the post curing step is conducted:

(a) prior to the solvent removal step wherein the post-curing step is conducted under a pressure of about 20 psi to about 4000 psi; or

(b) after the solvent removal step, wherein the post-curing step is conducted under an inert atmosphere or in a vacuum at a temperature of between about 50°C to about 450°C.

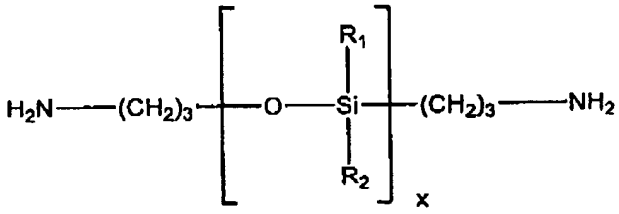
43-45. (Cancelled).

46. (Previously Presented) The process of claim 1 or claim 13, wherein the diamine monomer is an aliphatic diamine containing a linear alkyl chain unit of formula.



wherein n is a integer number from 1 to 12.

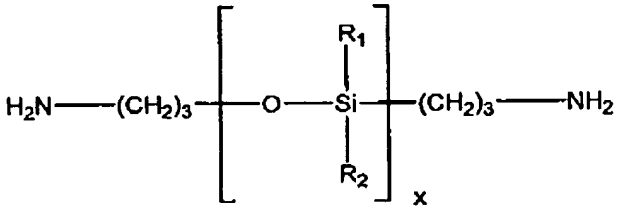
47. (Currently Amended) The process of claim 1 or claim 13, wherein the diamine monomer is an amino terminated polysiloxane of the formula



wherein R_1 and R_2 are each independently selected from the group consisting of hydrogen, optionally substituted alkyl, optionally substituted alkenyl, optionally substituted alkynyl, optionally substituted cycloalkyl, optionally substituted cycloalkyl-alkyl, optionally substituted aryl, optionally substituted aralkyl, and optionally substituted alkoxy; and

x is between about 32 to about 44.

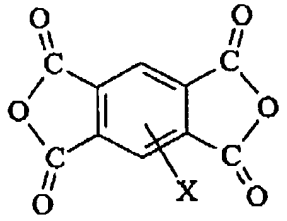
48. (Currently Amended) The process of claim 47, wherein the amino terminated polysiloxane is a thermally stable polysiloxane of the formula



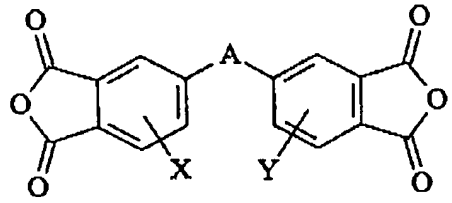
wherein R_1 and R_2 are independently selected from optionally substituted alkyl having from 1 to about 12 carbon atoms and optionally substituted phenyl; and

x is between 32 and 44.

49. (Previously Presented) The process of any claim 1 or claim 13, wherein the aromatic dianhydride is monomer represented by either formula III or IV



III



IV

wherein X and Y are monofunctional substituents selected from hydrogen, halogen, carboxyl, alkyl, and alkoxy groups, X and Y may be the same or different substituents and A is a bivalent connecting group selected from -O-, -S-, -CO-, -S-, -SO_2-, -CH_2-, or A is a single bond.

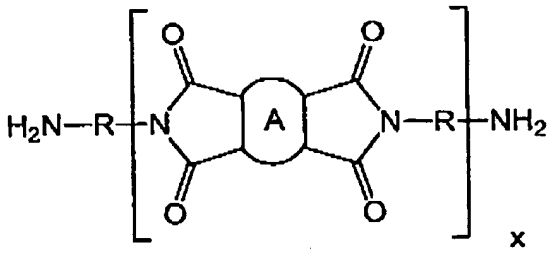
50. (Original) The process of claim 49, wherein the aromatic dianhydride is selected from the group consisting of optionally substituted pyromellitic dianhydride, optionally substituted 3,3',4,4'-biphenyltetracarboxylic dianhydride, optionally substituted 3,3',4,4'-benzophenone tetracarboxylic dianhydride, and optionally substituted 2,3,6,7-naphthylene tetracarboxylic acid dianhydride.

51. (Previously Presented) The process of claim 1 or claim 13, wherein the dehydrating agent comprises at least one compound selected from the group consisting of acetic anhydride, propionic anhydride, n-butyric anhydride, benzoic anhydride, trifluoroacetic anhydride, and phosphous trichloride.

52. (Currently Amended) The process of claim 1 or claim 13~~claim 43~~, wherein the organic base is selected from optionally substituted mono-, di- and trialkylamines, optionally substituted pyridines, optionally substituted isoquinoline, optionally substituted morpholine, optionally substituted piperadine, and optionally substituted piperazine.

53. (Cancelled).

54. (Currently Amended) A polyimide aerogel ~~comprising consisting essentially of~~ at least one polyimide polymer is a polyimide of the formula:



wherein

represents an optionally substituted aryl group, an optionally substituted alicyclic group, an optionally substituted heteroaryl group, or an optionally substituted heteroalicyclic group;

R is an difunctional optionally substituted alkylene, optionally substituted difunctional alicyclic hydrocarbon group, or a combination thereof; and

x is a number greater than about 2.

55. (Cancelled).

56. (Previously Presented) A polyimide aerogel of claim 54, having a density of 0.3 g/cc or less.

57. (Original) A polyimide aerogel of claim 56 wherein the aerogel density is between 0.01 and 0.2 g/cc.

58. (Previously Presented) A polyimidc aerogel of claim 54, having a yield strength of about 1 MPa or more.

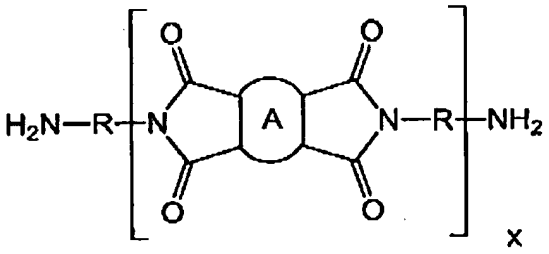
59. (Previously Presented) A polyimide aerogel of claim 54, having a surface area of more than about 400 m^2/g.

60. (Original) A polyimidc aerogel of claim 59 having a surface area of between about 500 and about 1200 m^2/g.

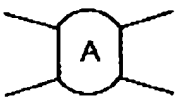
61. (Previously Presented) A polyimidc aerogel of claim 54, having an average pore size of between about 1 to about 100 nm.

62. (Original) A polyimide aerogel of claim 61 having an average pore size of between about 10 and 40 nm.

63. (Previously Presented) A polyimide aerogel of claim 54 according to the formula



wherein



represents an optionally substituted aryl group, an optionally substituted alicyclic group, an optionally substituted heteroaryl group, or an optionally substituted heteroalicyclic group;

R is a difunctional optionally substituted alkylene group; and

x is a number greater than about 2.

64. (Previously Presented) A polyimide aerogel of claim 63, wherein

represents phenyl or biphenyl;

R represents C_{1-12}alkylene; and

x is a number greater than about 5.

65-103. (Cancelled).

104. (Currently Amended) An article of manufacture comprising at least one aerogel selected from polyimide aerogels of claim 54 or carbon aerogels comprising carbon and nitrogen, each of which may have metal particles dispersed in the pores of the acrogel.

105. (Currently Amended) The article of manufacture of claim 104, wherein the aerogel is a polyimide ~~aerogels~~ aerogel provided by claim 54.

106. (Previously Presented) An electrode composed of at least one aerogel selected from carbon aerogels comprising carbon and nitrogen which has metal particles dispersed in the pores of the aerogel.

107. (Cancelled).

108. (Previously Presented) An electrochemical cell comprising one or more electrodes composed of at least one aerogel selected from carbon aerogels comprising carbon and nitrogen which has metal particles dispersed in the pores of the aerogel.

109. (Cancelled).

110. (Original) An electrochemical cell of claim 108, wherein the electrochemical cell is selected from a battery, a capacitor, a supercapacitor, fuel cell, or capacitive deionization cell.

111. (Currently Amended) A supported metal catalyst comprising a carbon aerogel comprising carbon and nitrogen having metal particles dispersed therein ~~or a metal carbide aerogel~~.

112. (New). The polyimide aerogel of claim 54, further consisting essentially of a reinforcing agent.

113. (New). The polyimide aerogel of claim 112, wherein the reinforcing agent is selected from a reinforcement pad, organic or inorganic fibers carbon nanotubes, metallic fillers or particles or inorganic fillers or particles.

114. (New). The polyimide aerogel of claim 112, wherein the fiber reinforcement pad is selected from a non-woven or woven fiber reinforcement composed of a polymeric organic fiber, a glass fiber, a ceramic fiber, a carbon precursor fiber, or a biopolymer fiber.